Subject	**Engineering**	Year Group	**10**			
	Term/Unit 1	Term/Unit_2	Term/Unit 3	Term/Unit 4	Term/Unit 5	Term/Unit 6
Scheme title	Foundations of Engineering and Material Processing.	Engineering Tool Mastery and Material Manipulation.	Assembly, Finishing, and Theoretical Consolidation.	Engineering Design and Technical Communication.	Engineering Design and Technical Communication.	Mechanical Assembly, Testing, and Evaluation.
Purpose of scheme	This unit introduces pupils to the core disciplines of engineering, alongside essential material properties, tools, and processing techniques. Pupils will develop the theoretical knowledge required for their final NCFE Level 1/2 Engineering exam while applying these principles practically by designing and manufacturing a personalised door hook. By working with both timber and steel, pupils bridge the gap between theoretical understanding and practical workshop application, setting a strong foundation for their qualification.	The purpose of this unit is to deepen pupils' understanding of the machinery and equipment used in engineering (Theory Area 5). By moving from hand tools to more complex machinery, pupils learn how industrial processes scale and how material properties dictate the choice of equipment. This term focuses on the precision required to work with steel and timber simultaneously, ensuring that the theoretical knowledge of material characteristics is reinforced through direct physical feedback in the workshop.	The purpose of this unit is to bring the "Door Hook" project to completion, focusing on the assembly of timber and steel components and the application of protective finishes. Pupils will explore the theoretical importance of surface treatments and corrosion prevention (Theory Area 4) while refining their final product. This term also serves as a critical review period, where pupils synthesise the knowledge from Areas 1, 4, 5, and 9 to ensure they can apply theoretical concepts to complex, exam-style questions.	The purpose of this unit is to introduce pupils to the formal requirements of the NEA by responding to a past brief for a model dump truck. Pupils will focus on Theory Area 3 (Engineering Communication), learning how to interpret and produce the technical drawings that are vital for manufacturing success. By investigating a genuine past brief, pupils learn how to analyse client needs and environmental constraints, ensuring their designs are both functional and compliant with engineering standards.	The purpose of this unit is to introduce pupils to the formal requirements of the NEA by responding to a past brief for a model dump truck. Pupils will focus on Theory Area 3 (Engineering Communication), learning how to interpret and produce the technical drawings that are vital for manufacturing success. By investigating a genuine past brief, pupils learn how to analyse client needs and environmental constraints, ensuring their designs are both functional and compliant with engineering standards.	The purpose of this unit is for pupils to finalise the manufacture of their model dump truck, focusing specifically on the integration of mechanical parts (Theory Area 7). This term mimics the high-pressure conclusion of a real NEA, where pupils must ensure that moving parts operate smoothly and reliably. By testing their prototypes against their original specifications, pupils develop the critical analytical skills required for Theory Area 8 (Testing and Investigation), preparing them for the reflective thinking needed in their final year.
Knowledge in sequence	Pupils begin by exploring various engineering disciplines and the specific material properties outlined in NCFE theory areas one, four, five, and nine. They then learn to identify and safely select the correct tools, equipment, and machinery required for different engineering tasks. Following this theoretical foundation, pupils sequence their manufacturing steps to cut, shape, and finish both timber and steel. The unit concludes with pupils combining their theoretical knowledge and workshop practice to assemble and refine their personalised door hook.	Pupils progress from identifying tools to understanding the mechanics of how they operate. The sequence begins with the study of mechanical advantage and the power requirements of workshop machinery. Following this, pupils learn how to read technical data sheets for materials, applying this to the specific grades of steel and timber used in their project. The sequence moves into the practical application of marking out on different surfaces—using engineers' blue or scribers on steel versus pencils on timber—ensuring a high degree of accuracy before any material is removed.	Pupils begin by studying the various methods of permanent and semi-permanent joining, specifically focusing on how to secure steel to timber. They then move into the science of surface degradation, learning why different materials require specific finishes, such as oil for timber or paint/lacquer for steel. The sequence concludes with a rigorous theoretical review, where pupils map their practical workshop experiences back to the NCFE specification, ensuring they understand the "why" behind the engineering processes they have performed.	Pupils begin by deconstructing a past NEA brief, learning how to conduct targeted research into existing products and mechanical movements. They then move into the theory of technical drawing, studying line types, scale, and dimensioning standards. This knowledge is applied as pupils generate their own initial design ideas for the dump truck, ensuring they incorporate the mechanical components required by the brief. The sequence ends with pupils producing a finalised "working drawing" that provides all the necessary information for the manufacturing phase in the following term.	Pupils begin by deconstructing a past NEA brief, learning how to conduct targeted research into existing products and mechanical movements. They then move into the theory of technical drawing, studying line types, scale, and dimensioning standards. This knowledge is applied as pupils generate their own initial design ideas for the dump truck, ensuring they incorporate the mechanical components required by the brief. The sequence ends with pupils producing a finalised "working drawing" that provides all the necessary information for the manufacturing phase in the following term.	Pupils begin by studying the mechanics of motion, focusing on how different components (such as axles and pivots) interact within the dump truck. They then move into the theory of testing, learning the difference between destructive and non-destructive methods. Following the physical assembly of their model, pupils perform a series of functional tests to check for mechanical efficiency. The sequence concludes with a formal evaluation, where pupils document their findings and suggest modifications, alongside a final review of Theory Areas 3, 6, 7, and 8.
Skills	Pupils will develop vital practical workshop skills, including accurately measuring, marking out, cutting, and shaping timber and steel using appropriate hand tools and machinery. They will also embed safe workshop procedures into their routine, mastering material processing and finishing techniques to ensure the production of a high-quality, precise final product.	Pupils will refine their ability to operate machinery such as the pillar drill and sanding discs with high levels of control. They will develop specific skills in subtractive manufacturing, learning how to remove material from steel through filing and hacksawing to meet tight tolerances. Additionally, pupils will master the art of joining dissimilar materials, exploring how the fixings for their door hook must account for the different expansion rates and strengths of timber and steel.	Pupils will master the skill of final assembly, ensuring all components are aligned and functional. They will develop proficiency in surface preparation—using progressively finer grits of abrasive paper—and the even application of finishes. Critically, pupils will learn to perform a final "Quality Assurance" check, using callipers and squares to verify that their finished door hook meets the original design specification.	Pupils will develop advanced sketching and rendering skills to communicate their ideas visually. They will master the use of drawing equipment—such as set squares, compasses, and T-squares—to produce formal orthographic projections. Furthermore, pupils will enhance their analytical skills, learning how to evaluate their research findings to create a design specification that directly informs their creative output.	Pupils will develop advanced sketching and rendering skills to communicate their ideas visually. They will master the use of drawing equipment—such as set squares, compasses, and T-squares—to produce formal orthographic projections. Furthermore, pupils will enhance their analytical skills, learning how to evaluate their research findings to create a design specification that directly informs their creative output.	Pupils will develop precision assembly skills, ensuring that mechanical tolerances allow for movement without excessive "play" or friction. They will master the use of testing equipment to measure the performance of their prototype. Furthermore, pupils will refine their technical writing skills, learning how to use evidence-based reasoning to justify design changes and evaluate the success of their engineering project.
Key words	Engineering disciplines, material properties, timber, steel, hand tools, machinery, equipment, marking out, shaping, finishing, health and safety, manufacturing, processing.	Subtractive manufacturing, tolerances, mechanical advantage, pillar drill, engineers' blue, scriber, material fatigue, grain direction, abrasive, fixing, alignment, accuracy.	Assembly, surface finish, corrosion, degradation, Quality Assurance, permanent joining, lacquer, abrasive, callipers, specification, consolidation, synthesis.	NEA, brief, research, design specification, orthographic, dimensioning, scale, line types, client needs, mechanical movement, rendering, technical drawing.	NEA, brief, research, design specification, orthographic, dimensioning, scale, line types, client needs, mechanical movement, rendering, technical drawing.	Mechanical parts, assembly, pivots, axles, testing, non-destructive testing, investigation, evaluation, modification, performance, prototype, NCFE Area 8.
End point	By the end of this unit, pupils will have secured the foundational theory knowledge necessary for their Year 11 exam and will have successfully manufactured a functional, personalised door hook that demonstrates precision and safe, independent tool use.	By the conclusion of this unit, pupils will have completed the primary shaping of all components for their door hook. They will be able to explain the theoretical reasons for choosing specific tools based on material hardness and will have evidence of meeting specific measurement tolerances within ±1mm.	By the end of this unit, pupils will have produced a high-quality, finished door hook that is fit for purpose. They will possess a complete set of revision notes and successful baseline assessments for NCFE Theory Areas 1, 4, 5, and 9, demonstrating they are on track for their Year 11 external examination.	By the end of this unit, pupils will have completed the research and design sections of their practice NEA folder. They will have a set of technical drawings that are ready to be used in the workshop, along with a deep understanding of Theory Area 3, which is a significant component of the Year 11 exam.	By the end of this unit, pupils will have completed the research and design sections of their practice NEA folder. They will have a set of technical drawings that are ready to be used in the workshop, along with a deep understanding of Theory Area 3, which is a significant component of the Year 11 exam.	By the end of this unit, pupils will have completed a fully functional model dump truck with working mechanical parts. They will have a complete practice NEA folder that serves as a high-quality exemplar for their actual Year 11 assessment and will have finished all scheduled theory content for the academic year.
Assessment Methods	Pupils will complete summative end-of-topic theory assessments covering the specified NCFE content areas to check their exam readiness. Alongside this, their practical competency will be evaluated through a holistic assessment of their completed door hook, measuring the final outcome against their initial design tolerances and finish quality.	Assessment is conducted through a mid-project "quality gate" where pupils' components are inspected against a technical drawing. Theoretical progress is measured via a formal assessment on NCFE Area 5 (Tools, Equipment, and Machinery), requiring pupils to identify correct equipment and safety protocols for a variety of given engineering scenarios.	The final practical outcome is graded against a formal "Project Success Criteria" sheet, focusing on finish quality and dimensional accuracy. Theoretical understanding is assessed through a comprehensive mock-style test that combines questions from all theory areas covered in terms 1, 2, and 3, providing a clear indicator of pupils' current attainment level.	Assessment is based on the quality of the practice NEA portfolio entries, specifically focusing on the depth of research and the accuracy of the technical drawings. Pupils will also sit a formal theory test on Engineering Communication to ensure they can identify and use drawing conventions correctly in an exam setting.	Assessment is based on the quality of the practice NEA portfolio entries, specifically focusing on the depth of research and the accuracy of the technical drawings. Pupils will also sit a formal theory test on Engineering Communication to ensure they can identify and use drawing conventions correctly in an exam setting.	The final manufactured dump truck and the completed NEA portfolio are assessed as a whole, providing pupils with a predicted grade based on the NCFE marking criteria. Additionally, a final end-of-year theory exam covers all areas taught in Terms 4, 5, and 6 to identify any remaining knowledge gaps before Year 11.